

WHAT IS CLAIMED IS:

- 1 1. An antibody that specifically binds CD22, said anti-CD22 antibody
2 having a variable light (V_L) chain comprising three complementarity determining regions
3 (CDRs) designated in order from the CDR closest to the amino terminus to the CDR closest
4 to the carboxyl terminus CDRs 1, 2, and 3, wherein said CDR1 has a sequence selected from
5 the group consisting of SEQ ID NOs:7, 8, 9, and 10.
- 1 2. An anti-CD22 antibody of claim 1, wherein said CDR1 has the
2 sequence of SEQ ID NO:7.
- 1 3. An anti-CD22 antibody of claim 1, further wherein said CDR 2 has the
2 sequence of SEQ ID NO:11, and said CDR3 has the sequence of SEQ ID NO:12.
- 1 4. An anti-CD22 antibody of claim 1, wherein said V_L chain has the
2 sequence of SEQ ID NO:20.
- 1 5. An antibody of claim 1, further comprising a variable heavy (V_H) chain
2 comprising three complementarity determining regions (CDRs) designated in order from the
3 CDR closest to the amino terminus to the CDR closest to the carboxyl terminus CDRs 1, 2,
4 and 3, wherein
5 said CDR1 has the sequence of SEQ ID NO:13,
6 said CDR 2 has the sequence of SEQ ID NO:15, and
7 said CDR3 has a sequence selected from the group consisting of SEQ ID
8 NOs:15, 16, 17, 18, and 19.
- 1 6. An antibody of claim 5, wherein said CDR3 has the sequence of SEQ
2 ID NO:16.
- 1 7. An antibody of claim 5, wherein said V_H chain has the sequence of
2 SEQ ID NO:21.
- 1 8. An antibody of claim 1, wherein said antibody is selected from the
2 group consisting of an scFv, a dsFv, a Fab, or a $F(ab')_2$.
- 1 9. A chimeric molecule comprising
2 (a) an antibody that specifically binds CD22, said anti-CD22 antibody having

3 a variable light (V_L) chain comprising three complementarity determining regions (CDRs)
4 designated in order from the CDR closest to the amino terminus to the CDR closest to the
5 carboxyl terminus CDRs 1, 2, and 3, wherein said CDR1 has a sequence selected from the
6 group consisting of SEQ ID NOs:7, 8, 9, and 10; and

7 (b) a therapeutic moiety or a detectable label.

1 10. A chimeric molecule of claim 9, further wherein said CDR 2 has the
2 sequence of SEQ ID NO:11, and said CDR3 has the sequence of SEQ ID NO:12.

1 11. A chimeric molecule of claim 9, wherein said antibody further
2 comprises a variable heavy (V_H) chain comprising three complementarity determining
3 regions (CDRs) designated in order from the CDR closest to the amino terminus to the CDR
4 closest to the carboxyl terminus CDRs 1, 2, and 3, wherein
5 said CDR1 has the sequence of SEQ ID NO:13,
6 said CDR 2 has the sequence of SEQ ID NO:15, and
7 said CDR3 has a sequence selected from the group consisting of SEQ ID
8 NOs:15, 16, 17, 18, and 19.

1 12. A chimeric molecule of claim 9, wherein said V_L chain has the
2 sequence of SEQ ID NO:20 and said V_H chain has the sequence of SEQ ID NO:21.

1 13. A chimeric molecule of claim 9, wherein the therapeutic moiety is
2 selected from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded
3 with a drug or a cytotoxin.

1 14. A chimeric molecule of claim 13, wherein the effector moiety is a
2 cytotoxin.

1 15. A chimeric molecule of claim 14, wherein the cytotoxin is selected
2 from the group consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin,
3 diphtheria toxin, or a cytotoxic fragment or mutant thereof, *Pseudomonas* exotoxin A or a
4 cytotoxic fragment or mutant thereof ("PE"), and botulinum toxins A through F.

1 16. A chimeric molecule of claim 15, wherein said PE is selected from the
2 group consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1 17. A chimeric molecule of claim 15, wherein said PE has a substituent of
2 glycine, alanine, valine, leucine, or isoleucine in place of arginine at the position
3 corresponding to position 490 of SEQ ID NO:24.

1 18. A chimeric molecule of claim 17, wherein said substituent at the
2 position corresponding to position 490 of SEQ ID NO:24 is alanine.

1 19. A composition comprising a chimeric molecule of claim 9 and a
2 pharmaceutically acceptable carrier.

1 20. A composition comprising a chimeric molecule of claim 10 and a
2 pharmaceutically acceptable carrier.

1 21. A composition comprising a chimeric molecule of claim 11 and a
2 pharmaceutically acceptable carrier.

1 22. A composition comprising a chimeric molecule of claim 12 and a
2 pharmaceutically acceptable carrier.

1 23. A composition comprising a chimeric molecule of claim 14 and a
2 pharmaceutically acceptable carrier.

1 24. A composition comprising a chimeric molecule of claim 17 and a
2 pharmaceutically acceptable carrier.

1 25. A use of an antibody that specifically binds CD22, said anti-CD22
2 antibody having a variable light (V_L) chain comprising three complementarity determining
3 regions (CDRs), said CDRs designated in order from the CDR closest to the amino terminus
4 to the CDR closest to the carboxyl terminus as CDRs 1, 2, and 3, respectively, wherein said
5 CDR1 has a sequence selected from the group consisting of SEQ ID NOs:7, 8, 9, and 10, for
6 the manufacture of a medicament to inhibit the growth of a CD22+ cancer cell.

1 26. A use of claim 25, further wherein said CDR 2 has the sequence of
2 SEQ ID NO:11, and said CDR3 has the sequence of SEQ ID NO:12.

1 27. A use of claim 25, wherein said antibody further comprises a variable
2 heavy (V_H) chain comprising three complementarity determining regions (CDRs), said CDRs

3 being designated in order from the CDR closest to the amino terminus to the CDR closest to
4 the carboxyl terminus as CDRs 1, 2, and 3, respectively, wherein

5 said CDR1 has the sequence of SEQ ID NO:13,

6 said CDR 2 has the sequence of SEQ ID NO:15, and

7 said CDR3 has a sequence selected from the group consisting of SEQ ID
8 NOs:15, 16, 17, 18, and 19.

1 28. A use of claim 25, wherein said V_L chain has the sequence of SEQ ID
2 NO:20 and said V_H chain has the sequence of SEQ ID NO:21.

1 29. A use of claim 25, wherein said antibody is selected from the group
2 consisting of an scFv, dsFv, a Fab, or a F(ab')₂.

1 30. A use of claim 29, wherein said antibody is conjugated or fused to a
2 therapeutic moiety or a detectable label.

1 31 A use of claim 30, wherein the therapeutic moiety is selected from the
2 group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a drug or a
3 cytotoxin.

1 32. A use of claim 31, wherein the therapeutic moiety is a cytotoxin.

1 33. A use of claim 32, wherein the cytotoxin is selected from the group
2 consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria toxin
3 or a cytotoxic fragment or mutant thereof, a *Pseudomonas* exotoxin A or a cytotoxic
4 fragment or mutant thereof ("PE"), and botulinum toxins A through F.

1 34. A use of claim 33, wherein said PE is selected from the group
2 consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1 35. A use of claim 33, wherein said PE has a glycine, alanine, valine,
2 leucine, or isoleucine in place of arginine at the position corresponding to position 490 of
3 SEQ ID NO:24.

1 36. A use of claim 35, wherein alanine is substituted for arginine at the
2 position corresponding to position 490 of SEQ ID NO:24.

1 37. An isolated nucleic acid encoding a variable light (V_L) chain
2 comprising three complementarity determining regions (CDRs), said CDRs being designated
3 in order from the CDR closest to the amino terminus to the CDR closest to the carboxyl
4 terminus as CDRs 1, 2, and 3, respectively, wherein said CDR1 has a sequence selected from
5 the group consisting of SEQ ID NOs:7, 8, 9, and 10.

1 38. A nucleic acid of claim 37, further wherein said CDR 2 has the
2 sequence of SEQ ID NO:11, and said CDR3 has the sequence of SEQ ID NO:12.

1 39. A nucleic acid of claim 37, further encoding a variable heavy (V_H)
2 chain comprising three complementarity determining regions (CDRs), said CDRs designated
3 in order from the CDR closest to the amino terminus to the CDR closest to the carboxyl
4 terminus CDRs 1, 2, and 3, respectively, wherein
5 said CDR1 has the sequence of SEQ ID NO:13,
6 said CDR 2 has the sequence of SEQ ID NO:15, and
7 said CDR3 has a sequence selected from the group consisting of SEQ ID
8 NOs:15, 16, 17, 18, and 19.

1 40. A nucleic acid of claim 37, wherein said V_L chain has the sequence of
2 SEQ ID NO:20 and said V_H chain of said encoded antibody has the sequence of SEQ ID
3 NO:21.

1 41. A nucleic acid of claim 37, wherein said nucleic acid encodes an
2 antibody selected from the group consisting of an scFv, a dsFv, a Fab, or a $F(ab')_2$.

1 42. A nucleic acid of claim 37, further wherein said nucleic acid encodes a
2 polypeptide which is a therapeutic moiety or a detectable label.

1 43. A nucleic acid of claim 42, further wherein said therapeutic moiety is a
2 drug or a cytotoxin.

1 44. A nucleic acid of claim 43, further wherein said cytotoxin is
2 *Pseudomonas* exotoxin A or a cytotoxic fragment or mutant thereof ("PE").

1 45. A nucleic acid of claim 44, wherein said PE is selected from the group
2 consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1 46. A nucleic acid of claim 44, wherein said PE has a glycine, alanine,
2 valine, leucine, or isoleucine in place of arginine at the position corresponding to position 490
3 of SEQ ID NO:24.

1 47. A nucleic acid of claim 44, wherein alanine is substituted for arginine
2 at the position corresponding to position 490 of SEQ ID NO:24.

1 48. An expression vector comprising a nucleic acid of claim 37 operably
2 linked to a promoter.

1 49 An expression vector comprising a nucleic acid of claim 38, operably
2 linked to a promoter.

1 50. An expression vector comprising a nucleic acid of claim 39 operably
2 linked to a promoter.

1 51. An expression vector comprising a nucleic acid of claim 40, operably
2 linked to a promoter.

1 52. An expression vector comprising a nucleic acid of claim 44 operably
2 linked to a promoter.

1 52. An expression vector comprising a nucleic acid of claim 46 operably
2 linked to a promoter.

1 53. A method of inhibiting growth of a CD22+ cancer cell by contacting
2 said cell with a chimeric molecule comprising (a) an antibody that binds to CD22, said
3 antibody having a variable light (V_L) chain comprising three complementarity determining
4 regions (CDRs), said CDRs designated in order from the CDR closest to the amino terminus
5 to the CDR closest to the carboxyl terminus CDRs 1, 2, and 3, respectively, wherein said
6 CDR1 has a sequence selected from the group consisting of SEQ ID NOs:7, 8, 9, and 10, and
7 (b) a therapeutic moiety,
8 wherein said therapeutic moiety inhibits the growth of said cell.

1 54. A method of claim 53, further wherein said CDR 2 of said V_L has the
2 sequence of SEQ ID NO:11, and said CDR3 of said V_L has the sequence of SEQ ID NO:12.

1 55. A method of claim 53, wherein said antibody comprises a V_H chain
2 comprising three complementarity determining regions (CDRs), said CDRs designated in
3 order from the CDR closest to the amino terminus to the CDR closest to the carboxyl
4 terminus CDRs 1, 2, and 3, respectively, wherein
5 said CDR1 has the sequence of SEQ ID NO:13,
6 said CDR 2 has the sequence of SEQ ID NO:15, and
7 said CDR3 has a sequence selected from the group consisting of SEQ ID
8 NOs:15, 16, 17, 18, and 19.

1 56. A method of claim 55, wherein said V_L chain has the sequence of SEQ
2 ID NO:20 and said V_H chain has the sequence of SEQ ID NO:21.

1 57. A method of claim 53, wherein said antibody is selected from the
2 group consisting of an scFv, a dsFv, a Fab, or a F(ab')₂.

1 58. A method of claim 53, wherein said therapeutic moiety is selected
2 from the group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a
3 drug or a cytotoxin.

1 59. A method of claim 53, wherein the therapeutic moiety is a cytotoxin.

1 60. A method of claim 59, wherein the cytotoxin is selected from the
2 group consisting of ricin A, abrin, ribotoxin, ribonuclease, saporin, calicheamycin, diphtheria
3 toxin or a cytotoxic fragment or mutant thereof, *Pseudomonas* exotoxin A or a cytotoxic
4 fragment or mutant thereof ("PE"), and botulinum toxins A through F.

1 61. A method of claim 60, wherein said PE is selected from the group
2 consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1 62. A method of claim 60, wherein said PE has a glycine, alanine, valine,
2 leucine, or isoleucine in place of arginine at the position corresponding to position 490 of
3 SEQ ID NO:24.

1 63. A method of claim 62, wherein alanine is substituted for arginine at the
2 position corresponding to position 490 of SEQ ID NO:24.

1 64 A method for detecting the presence of a CD22+ cancer cell in a
2 biological sample, said method comprising:

3 (a) contacting cells of said biological sample with a chimeric molecule
4 comprising

5 (i) an antibody that specifically binds to CD22, said antibody having a
6 variable light (V_L) chain comprising three complementarity determining regions (CDRs), said
7 CDRs designated in order from the CDR closest to the amino terminus to the CDR closest to
8 the carboxyl terminus CDRs 1, 2, and 3, respectively, wherein said CDR1 has a sequence
9 selected from the group consisting of SEQ ID NOs:7, 8, 9, and 10, conjugated or fused to

10 (ii) a detectable label; and,

11 (b) detecting the presence or absence of said label,
12 wherein detecting the presence of said label indicates the presence of a CD22+ cancer cell in
13 said sample.

1 65. A method of claim 64, further wherein said CDR 2 of said V_L of said
2 antibody has the sequence of SEQ ID NO:11, and said CDR3 of said V_L of said antibody has
3 the sequence of SEQ ID NO:12.

4 66. A method of claim 64, wherein said antibody further comprises a
5 variable heavy (V_H) chain comprising three complementarity determining regions (CDRs),
6 said CDRs designated in order from the CDR closest to the amino terminus to the CDR
7 closest to the carboxyl terminus CDRs 1, 2, and 3, respectively, wherein
8 said CDR1 has the sequence of SEQ ID NO:13,
 said CDR 2 has the sequence of SEQ ID NO:15, and
 said CDR3 has a sequence selected from the group consisting of SEQ ID
 NOs:15, 16, 17, 18, and 19.

1 67. A method of claim 64, wherein said V_L chain has the sequence of SEQ
2 ID NO:20 and said V_H chain has the sequence of SEQ ID NO:21.

1 68. A method of claim 64, wherein said antibody is selected from the
2 group consisting of an scFv, a dsFv, a Fab, or a F(ab')₂.

1 69. A kit comprising:

2 (a) a container, and

3 (b) a chimeric molecule comprising

4 (i) an anti-CD22 antibody having a variable light (V_L) chain

5 comprising three complementarity determining regions (CDRs), said CDRs designated in
6 order from the CDR closest to the amino terminus to the CDR closest to the carboxyl
7 terminus CDRs 1, 2, and 3, respectively, wherein said CDR1 has a sequence selected from
8 the group consisting of SEQ ID NOs:7, 8, 9, and 10, conjugated or fused to

9 (ii) a detectable label or a therapeutic moiety.

1 70. A kit of claim 69, further wherein said CDR 2 of said V_L of said
2 antibody has the sequence of SEQ ID NO:11, and said CDR3 of said V_L of said antibody has
3 the sequence of SEQ ID NO:12.

1 71. A kit of claim 69, wherein said antibody further comprises a variable
2 heavy (V_H) chain comprising three complementarity determining regions (CDRs) designated
3 in order from the CDR closest to the amino terminus to the CDR closest to the carboxyl
4 terminus CDRs 1, 2, and 3, wherein

5 said CDR1 has the sequence of SEQ ID NO:13,

6 said CDR 2 has the sequence of SEQ ID NO:15, and

7 said CDR3 has a sequence selected from the group consisting of SEQ ID
8 NOs:15, 16, 17, 18, and 19.

1 72. A kit of claim 71, wherein said V_L chain has the sequence of SEQ ID
2 NO:20 and said V_H chain has the sequence of SEQ ID NO:21.

1 73. A kit of claim 69, wherein said antibody is selected from the group
2 consisting of an scFv, a dsFv, a Fab, or a $F(ab')_2$.

1 74. A kit of claim 69, wherein said therapeutic moiety is selected from the
2 group consisting of a cytotoxin, a drug, a radioisotope, or a liposome loaded with a drug or a
3 cytotoxin.

1 75. A *Pseudomonas* exotoxin A or a cytotoxic fragment or mutant thereof,
2 wherein said PE has a glycine, alanine, valine, leucine, or isoleucine in place of arginine at
3 the position corresponding to position 490 of SEQ ID NO:24.

1 76. A PE of claim 75, selected from the group consisting of PE35, PE38,
2 PE38KDEL, PE40, PE4E, and PE38QQR.

1 77. A PE of claim 75, having an alanine at a position corresponding to
2 position 490 of SEQ ID NO:24.

1 78. A chimeric molecule comprising a targeting moiety conjugated or
2 fused to a *Pseudomonas* exotoxin A or a cytotoxic fragment or mutant thereof ("PE"),
3 wherein said PE has a glycine, alanine, valine, leucine, or isoleucine in place of arginine at a
4 position corresponding to position 490 of SEQ ID NO:24.

1 79. A chimeric molecule of claim 78 wherein said PE is selected from the
2 group consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1 80. A chimeric molecule of claim 78 wherein said PE has an alanine at a
2 position corresponding to position 490 of SEQ ID NO:24.

1 81. A chimeric molecule of claim 78 wherein said targeting moiety is an
2 antibody.

1 82. A chimeric molecule of claim 81, wherein said antibody is selected
2 from the group consisting of an scFv, a dsFv, a Fab, or a F(ab')₂.

1 83. A composition comprising a chimeric molecule of claim 78 and a
2 pharmaceutically acceptable carrier.

1 84. A composition comprising a chimeric molecule of claim 79 and a
2 pharmaceutically acceptable carrier.

1 85. An isolated nucleic acid encoding *Pseudomonas* exotoxin A or
2 cytotoxic fragment or mutant thereof ("PE"), wherein said PE has a glycine, alanine, valine,
3 leucine, or isoleucine in place of arginine at a position corresponding to position 490 of SEQ
4 ID NO:24.

1 86. An isolated nucleic acid of claim 85 wherein said PE is selected from
2 the group consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1 87. An isolated nucleic acid of claim 85 wherein said PE has an alanine at
2 the position corresponding to position 490 of SEQ ID NO:24.

1 88. An isolated nucleic acid of claim 85 wherein said nucleic acid further
2 encodes a targeting moiety.

1 89. An isolated nucleic acid of claim 88 wherein said targeting moiety is
2 an antibody.

1 90. An isolated nucleic acid of claim 89, wherein said antibody is selected
2 from the group consisting of an scFv, a dsFv, a Fab, or a F(ab')₂.

1 91. An expression vector comprising a nucleic acid of claim 85 operably
2 linked to a promoter.

1 92 An expression vector comprising a nucleic acid of claim 86, operably
2 linked to a promoter.

1 93. An expression vector comprising a nucleic acid of claim 87 operably
2 linked to a promoter.

1 94. An expression vector comprising a nucleic acid of claim 88, operably
2 linked to a promoter.

1 95. A use of a targeting moiety conjugated or fused to *Pseudomonas*
2 exotoxin A or a cytotoxic fragment or a mutant thereof ("PE"), wherein said PE has a glycine,
3 alanine, valine, leucine, or isoleucine in place of arginine at a position corresponding to
4 position 490 of SEQ ID NO:24, for the manufacture of a medicament to inhibit the growth of
5 cells targeted by said targeting moiety.

1 96. A use of claim 95, wherein said PE is selected from the group
2 consisting of PE35, PE38, PE38KDEL, PE40, PE4E, and PE38QQR.

1 97. A use of claim 95 wherein said PE has an alanine at the position
2 corresponding to position 490 of SEQ ID NO:24.

1 98. A use of claim 95 wherein said targeting moiety is an antibody.

1 99. A use of claim 98, wherein said antibody is selected from the group
2 consisting of an scFv, a dsFv, a Fab, or a F(ab')₂.

1 100. A method of inhibiting the growth of a cell bearing a target molecule,
2 said method comprising contacting said cell with a chimeric molecule comprising
3 (a) a targeting moiety that binds to said target molecule, and
4 (b) *Pseudomonas* exotoxin A or a cytotoxic fragment or mutant thereof
5 ("PE"), wherein said PE has a glycine, alanine, valine, leucine, or isoleucine in place of
6 arginine at a position corresponding to position 490 of SEQ ID NO:24, wherein contacting
7 said cell with said chimeric molecule inhibits the growth of said cell.

1 101. A method of claim 100, wherein said target molecule is a cytokine
2 receptor and said targeting moiety is a cytokine which binds to said receptor.

1 102. A method of claim 100, wherein said target molecule is an antigen and
2 said targeting molecule is an antibody which binds to said antigen.

1 103. A method of claim 102, wherein said antigen is a tumor associated
2 antigen.

1 104. A method of claim 100, wherein said wherein said PE has an alanine in
2 place of arginine at a position corresponding to position 490 of SEQ ID NO:24.

1 105. A method of claim 100, wherein the target molecule is the IL-13
2 receptor and the targeting molecule is IL-13, a mutated IL-13 that retains the ability to bind
3 the IL-13 receptor, a circularly permuted IL-13, or an antibody that specifically binds a chain
4 of the IL-13 receptor but which does not also bind the IL-4 receptor.